










Date: Monday, 6/5/2006 7:32:07 AM
 User: Linda Lacelle

Process Sheet

Customer	: CU-DAR001 Dart Helicopters Services	Drawing Name	: HIGH AFT X-TUBE 412
Job Number	: 27390		
Estimate Number	: 10559		
P.O. Number	:	Part Number	: D412664203
This Issue	: 6/5/2006	S.O. No.	:
Prsht Rev.	: NC	Drawing Number	: D412-664-243 REV B
First Issue	: 6/5/2006	Project Number	: N/A
Previous Run	: 27389	Drawing Revision	: B
Written By	:	Material	:
Checked & Approved By	:	Due Date	: 6/30/2006
Comment	: Est Rev:E 04.02.16 Reformat; Added D3189-1 K/DS : Est Rev:F 06-03-29 Remove Coments on Pick List JLM		
Additional Product			
Job Number: 			
Seq. #:	Machine Or Operation:	Description :	
1.0	DC	DOCUMENT CONTROL	
			
Comment: DOCUMENT CONTROL Photocopy bluefile and create labels as per PPP D412-664-203 CHG 003			
2.0	D6009129	Crosstube Material	
			
Comment: Qty.: 1.0000 Each(s)/Unit Total: 1.0000 Each(s) Pick: Qty Part number Description Batch 1 D6009-129 Crosstube <u>B25942</u> Check OD = 3.500"; ID = 2.250"			
3.0	MORI SEIKI	MORI SEIKI CNC LATHE LARGE	
			
Comment: MORI SEIKI CNC LATHE LARGE 1-Fill tube with sand & install plugs DT8534 on both ends as per Folio FA166 2-Turn first side as per Folio FA166 3-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D412-664-243. BG 06.06.05 1			
4.0	QC1	INSPECT ALL DIM TO DIM SHEET	
			
Comment: INSPECT ALL DIM TO DIM SHEET BG 06.06.05 1			

W/O:		WORK ORDER CHANGES					
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NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Design Mgr	Approval QC Inspector
			Initial Design Mgr	Action Description Design Mgr	Sign & Date			

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

NOTE: Date & initial all entries

QA: N/C Closed: _____ Date: _____

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5.0

MORI SEIKI

MORI SEIKI CNC LATHE LARGE



Comment: MORI SEIKI CNC LATHE LARGE

1-Turn second side as per Folio FA166

2-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D412-664-243.

3-Polish entire outside surface of crosstube

4- Remove sand and plugs

5-Scribe part # and batch # using vibrating stylus as per Dwg D412-664-243

BSG 06.06.05

6.0

QC1

INSPECT ALL DIM TO DIM SHEET



Comment: INSPECT ALL DIM TO DIM SHEET

BSG 06.06.05

7.0

QC8

SECOND CHECK



Comment: SECOND CHECK

J.C 06/06/05

8.0

HAND FINISHING1

HAND FINISHING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

Chemical Conversion Coat as per QSI 005 4.1

BT 06-06-06

9.0

QC3/5

INSPECT WORK/WING WALK



Comment: Inspect work & Chemical conversion Coat

Pm 06-06-13

10.0

BENDING

BENDING MACHINE



Comment: BENDING MACHINE

Bend tube as per Dwg D412-664-243 using CNC bender program 412-af and Folio FT010

Pmc

DP 6-6-13

11.0

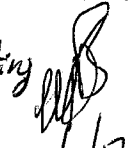

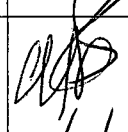
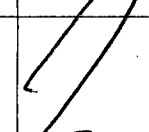
QC6

DIMENSIONAL CHECK



Comment: DIMENSIONAL CHECK

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			Initial Design Mgr	Action Description Design Mgr	Sign & Date			
07-01-17	10.0	Tube was bent too much in the middle, resulting in the tube being over bent, but still maintaining good angles.	 07/01/17	No use for engineering. Scraps: destroy. See Attached E-mail.	ET 07-01-17	 07-01-17	 07/01/17	 07-01-17

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

NOTE: Date & initial all entries

QA: N/C Closed: _____ Date: _____

Date: Monday, 6/5/2006 7:32:07 AM
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Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: HIGH AFT X-TUBE 412

Job Number: 27390

Part Number: D412664203

Job Number:



Seq. #:	Machine Or Operation:	Description :
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12.0

LANDING GEAR 1

LANDING GEAR RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

1-Drill pilot holes in tube as per Dwg D412-664-243 using drill Jig DT8550 & DT8551

2-Ream hole to finish size in tube as per Dwg D412-664-243 using drill Jig DT8550 & DT8551. Check dimensions between holes, both sides on both cuffs, to ensure alignment with saddle holes.

3-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D412-664-243

13.0

HAND FINISHING1

HAND FINISHING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

Chemical Conversion Coat as per QSI 005 4.1

14.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

15.0

OUTSIDE SERVICE

OUTSIDE SERVICES



Comment: Sub-Contracting OUTSIDE SERVICES

Liquid Penetrant Inspection as per QSI 038 Or

Issue P/O: _____ LPI as per ASTM 1417

Level 2 Attach copy of NDT results to work order

16.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Inspect for transit damage

Ensure copy of NDT results attached to work order.

17.0

QC6

DIMENSIONAL CHECK



Comment: Inspect for damage & ensure results are as per Dwg D412-664-203

W/O:		WORK ORDER CHANGES					
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Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: HIGH AFT X-TUBE 412

Job Number: 27390

Part Number: D412664203

Job Number:



Seq. #:	Machine Or Operation:	Description :
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18.0

SPRAY PAINTING

SPRAY PAINTING



Comment: SPRAY PAINTING

1-Prime inside and outside crosstube as per QSI 005 4.2

2-Paint outside crosstube with White Imron as per QSI 005 4.2

19.0

QC14

Inspect Spray Paint



Comment: Inspect Spray Paint

Wrap in plastic bag to protect from scratches

20.0

D2856600

Abrasion Strip



Comment: Qty.: 1.7640 f(s)/Unit Total : 1.7640 f(s)

Pick:

Qty Part number Description Batch

2 D2856-600(Cut to 10.090") Abrasion Strip

21.0

D2856600

Abrasion Strip



Comment: Qty.: 1.0080 f(s)/Unit Total : 1.0080 f(s)

Pick:

Qty Part number Description Batch

1 D2856-600(Cut to 10.870") Abrasion Strip

22.0

D28961

Support



Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)

Pick:

Qty Part number Description Batch

1 D2896-1 Support

23.0

D31891

Chafing Shield



Comment: Qty.: 2.0000 Each(s)/Unit Total : 2.0000 Each(s)

Pick:

Qty Part number Description Batch

2 D3189-1 Chafing Sheild

W/O:		WORK ORDER CHANGES					
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Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: HIGH AFT X-TUBE 412

Job Number: 27390

Part Number: D412664203

Job Number:



Seq. #:	Machine Or Operation:	Description :
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24.0	MS2192028	Clamp(per MIL-DTL-8783C)
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Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)

Pick:

Qty Part number Description Batch

4 MS21920-28 Clamp _____

25.0	MS2192030	clamp(per MIL-DTL-8783C)
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Comment: Qty.: 2.0000 Each(s)/Unit Total : 2.0000 Each(s)

Pick:

Qty Part number Description Batch

2 MS21920-30 Clamp _____

26.0	LANDING GEAR 1	LANDING GEAR RESOURCE 1
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Comment: LANDING GEAR RESOURCE 1

Assemble as per Dwg D412-664-203

27.0	QC5	INSPECT WORK TO CURRENT STEP
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Comment: INSPECT WORK TO CURRENT STEP

28.0	PACKAGING 1	PACKAGING RESOURCE #1
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Comment: PACKAGING RESOURCE #1

Pick Packing Kit

29.0	AN640A	Bolt
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Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)

Bolt

Batch: _____

30.0	AN641A	Bolt
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Comment: Qty.: 2.0000 Each(s)/Unit Total : 2.0000 Each(s)

Bolt

Batch: _____

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Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: HIGH AFT X-TUBE 412

Job Number: 27390

Part Number: D412664203

Job Number:



Seq. #:

Machine Or Operation:

Description :

31.0

AN960JD616

Washer



Comment: Qty.: 18.0000 Each(s)/Unit Total : 18.0000 Each(s)

Washer

Batch: _____

32.0

MS21042L6

Nut



Comment: Qty.: 6.0000 Each(s)/Unit Total : 6.0000 Each(s)

Nut

Batch: _____

33.0

QC4

INSPECT 100% KITS FOR COMPLETENESS



Comment: INSPECT 100% KITS FOR COMPLETENESS

34.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Identify and pack for shipping as per PPP D412-664-203

Location: _____

PPP Rev: _____

35.0

DC

DOCUMENT CONTROL



Comment: DOCUMENT CONTROL

Inspection Level 21

Job Completion



u 07-01-18

W/O:		WORK ORDER CHANGES					
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Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

NOTE: Date & initial all entries

QA: N/C Closed: _____ Date: _____

DART AEROSPACE LTD		Work Order:	27390
Description: Crosstube Assembly (412 High Aft)		Part Number:	D412-664-243
Inspection Dwg: D412-664-243 Rev: B		Page 1 of 1	

FIRST ARTICLE INSPECTION CHECKLIST

☒ First Article
 ☐ Prototype

	Inspection Sheet Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
SIDE A	2.684	+0.005/-0.000	2.688	✓			
	2.748	+0.005/-0.000	2.752	✓			
	2.884	+0.005/-0.000	2.888	✓			
	3.019	+0.005/-0.000	3.023	✓			
	3.163	+0.005/-0.000	3.166	✓			
	3.308	+0.005/-0.000	3.312	✓			
	3.429	+0.005/-0.000	3.432	✓			
	2.990	+0.005/-0.000	2.993	✓			
	2.618	+0.005/-0.000	2.622	✓			
	0.200	+/-0.010	.200	✓			
	R0.063	+/-0.010	.063	✓			
	R0.500	+/-0.010	.500	✓			
	4.971	+/-0.001	4.970	✓			
SIDE B	2.684	+0.005/-0.000	2.688	✓			
	2.748	+0.005/-0.000	2.752	✓			
	2.884	+0.005/-0.000	2.889	✓			
	3.019	+0.005/-0.000	3.023	✓			
	3.163	+0.005/-0.000	3.165	✓			
	3.308	+0.005/-0.000	3.311	✓			
	3.429	+0.005/-0.000	3.432	✓			
	2.990	+0.005/-0.000	2.994	✓			
	2.618	+0.005/-0.000	2.622	✓			
	0.200	+/-0.010	.200	✓			
	R0.063	+/-0.010	.063	✓			
	R0.500	+/-0.010	.500	✓			
	4.971	+/-0.001	4.970	✓			
	124.09	+/-0.020	124.09	✓			

Measured by:	SG	Audited by:	J.G.	Prototype Approval:	N/A
Date:	06.06.05	Date:	06/06/05	Date:	N/A

Rev	Date	Change	Revised by	Approved
A	04.06.16	New Issue (P/O D412-664-203)	KJ/JLM	
B	06.03.09	Dwg Rev updated	KJ/JLM	

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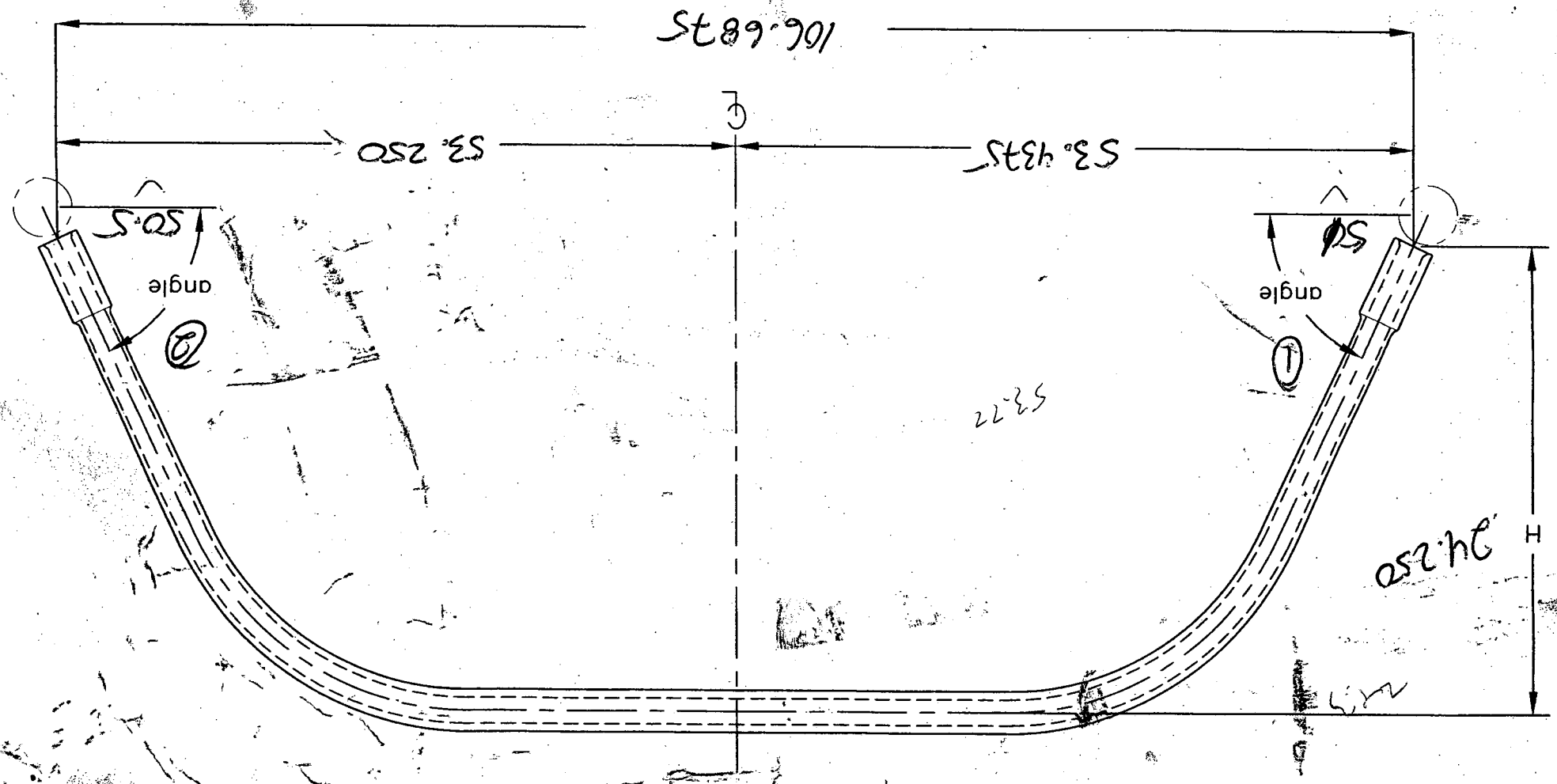
Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

NOTE: Date & initial all entries

QA: N/C Closed: _____ Date: _____

DATE: 06-10-04
 DESCRIPTION: 412-664-203
 BATCH NO: 827330
 DRAWING: 412-664-243 Rev. B
 H: 24.37
 1/2 SPAN: 53.72
 TOTAL SPAN: 107.44
 ANGLE: 50.72

Height above. Side @ 1m by 2.50
 • 753 below nominal total span
 • 633 below min. tolerance. on total span



Jason Murdoch

From: David Shepherd [dshepherd@dartaero.com]
Sent: Wednesday, January 17, 2007 2:58 PM
To: 'Jason Murdoch'
Cc: 'Lacelle, Linda'
Subject: RE: Drawings

Jason,

I agree with your assessment.

B29531, B27989, B29105, and B29506 are acceptable deviations.

~~[B27390 should be scrapped.]~~

I have tried to assemble the landing gear with large variations in angle between fwd and aft crosstube (ie. 48 to 51 degrees) and have found that installation is acceptable. Therefore, I think these tubes are OK.

David

From: Jason Murdoch [mailto:jmurdoch@dartaero.com]
Sent: Wednesday, January 17, 2007 6:34 AM
To: 'David Shepherd'
Subject: FW: Drawings

The tubes fit the tables very well apart from B27390, which I think is scrap. Is it cool to sign off on the rest of them, I think they're good. But are the angles going to be an issue upon installation?

jmurdoch@dartaero.com

Q.C. COORDINATOR

From: Jason Murdoch [mailto:jmurdoch@dartaero.com]
Sent: Monday, January 15, 2007 12:38 PM
To: 'David Shepherd'
Subject: FW: Drawings

How are these dims for your liking? These are the ones that I wanted you to look at.

jmurdoch@dartaero.com

Q.C. COORDINATOR

From: Brigitte Golden [mailto:bgolden@dartaero.com]
Sent: Monday, January 15, 2007 10:48 AM
To: jmurdoch@dartaero.com
Subject: Drawings